

## **Monk seal sightings in the central Ionian Sea**

### **A network of fishermen for the protection of the marine resources**

By Alikí Panou

Archipelagos – environment and development

#### **Introduction and methods**

The Ionian Sea in Greece is one of the areas best studied in the Mediterranean Basin concerning the highly endangered Mediterranean monk seal, *Monachus monachus*. It is estimated that half of the total world population of Mediterranean monk seals - about 250-300 individuals - lives in Greek waters. Approximately 15-20% of the Greek population lives and breeds in the Ionian Sea.

The central Ionian Sea hosts a great variety of coastal habitats: wetlands, lagoons, large sandy beaches in the south along with rocky parts and marine caves suitable for the resting and reproduction of the monk seals but also steep rocky cliffs exposed to the deep waters of the open Ionian Sea in the northern part with numerous marine caves, partly with an underwater entrance. The same features occur in Zakynthos island in the southern Ionian Sea. On the other hand, the shallow enclosed sea east of Ithaca contains 36 smaller islands with a number of marine caves used by seals scattered all over the area.

We began our studies on the Mediterranean monk seal in Kefalonia, Lefkada and Ithaca islands in the central Ionian Sea in 1985. Soon after the first few months, we developed and implemented an integrated strategy for the first time ever at international level: in addition to basic parameters such as the study of the seal population and its habitats, public awareness, etc., we took into consideration additional parameters that had never been studied before. For the first time ever, the seal damage to gear and catch was systematically recorded with the help and co-operation of the fishermen (which traditionally led to the killing of seals), and the degree of this damage was established scientifically. The interaction between seals and fishermen was studied, and proposals for mitigating this crucial problem were elaborated. Additionally, chemical analyses were conducted of seawater pollution and contamination of fish, and the first proposal for coastal protection areas was elaborated.

Our conservation efforts expanded to Zakynthos island in the southern Ionian Sea in 1990 using the same methodology throughout the Ionian Sea (Jacobs *et al.* 1990, 1991).

Apart of the above activities, the first network for the collection and evaluation of seal observations in Greece was created in the central Ionian Sea in 1985. The method was expanded to Zakynthos in 1990 (see above). The aim was to establish local networks of recording direct or indirect evidence of monk seals involving mainly the local population but also tourists in order to obtain valuable data and, at the same time, to promote the public awareness about the need for the conservation of the monk seal. This network has been operating in the central Ionian Sea since 1985 without interruption within the framework of several projects.

All reports of seal sightings by people other than the teams were recorded along with data on size, colour, scars and other characteristics of the animal, the date, time and place of each observation, as also data on the observer so as to be able to estimate the reliability of the information. Of course, the assessment of reliability of sightings is always to a certain degree a subjective matter based on familiarity with local persons and conditions but our teams were always present for long periods of time in the study area, well acquainted with the conditions.

Vague reports of sightings without details, or “almost” sightings when observers were not absolutely sure about their sighting were rejected as unreliable. Reports of persons known as exaggerating facts were also rejected. Furthermore, the animals’ colour was considered only as a corroborating evidence and not a main characteristic of each individual since it is changing with wet or dry fur, etc. Cross checks were done with own observations and/or evidence of use of terrestrial habitat (size and frequencies of tracks in caves). Most of the reports proved to be in accordance with own observations. As expected, fishermen reported by far the highest number of seal sightings followed by other local people. Tourists contributed the lowest number of sightings.

By carefully comparing the reliable data obtained according to the above characteristics and taking into consideration the date, the time and the place of each sighting, a minimum number of seals revealed for each period of time. These data were then matched with data of own observations. The results in a given period of time were mostly in accordance with the results of the field studies carried out by our experienced teams.

The estimate of the number of pups is probably more accurate than that of adults: since they are much smaller than adults or juveniles and limited to a small area they can easily be distinguished from each other and from other individuals. In contrast, the number of adults is probably often underestimated: many reports of one big dark animal may refer to one single seal or to two or more different animals. In this case, always the minimum number is taken into consideration.

The network proved to be an important tool for the evaluation of the seal population. Here, a summary of the results of some periods of particularly intensive collection of sightings combined with the regular monitoring of the population by experienced teams is presented and the results of a 10-month period without parallel monitoring by a team are compared.

## Results

### **I. Conservation of the Mediterranean Monk Seal, *Monachus monachus*, in Kefalonia, Ithaca and Lefkada isl., Ionian Sea, Greece.**

This sub-project carried out by the Institute of Zoology, University of Munich, Germany (Jacobs & Panou 1988, Panou *et al.* 1993) focused mainly on the northern part of the central Ionian Sea in the period July 1986 – May 1988. Nevertheless, due to the permanent presence of the team in the study area, sightings from the southern part of the area were also obtained allowing an overall estimation of the seal population.

A total of 315 reliable sightings were recorded. Matching these data with own seal sightings our cautious conclusion revealed a minimum number of 18-20 different seals (8-9 pups) in the entire central Ionian Sea. However, the above absolute minimum numbers, and particularly the number of adult seals both males and females, are most probably underestimated: a total of about 25 different seals may actually have been observed.

### **II. WWF Project GR0034.01 «Conservation programme for the Ionian: Activity 1: Kefalonia & Ithaca».**

This project was carried out by the Institute of Zoology, University of Munich (Jacobs & Panou 1996) during the period July 1992 - June 1995. A total of 115 seal sightings were reported, and our cautious estimation is an absolute minimum number of 19 different seals (2 juveniles and 8-9 pups). Here again, the minimum number of different animals is most probably underestimated. A corroborating evidence for a higher population number is the high number of pups. Thus, a “reasonable” maximum number of 25-27 seals altogether may be more accurate.

It should be added here that there was a considerable decrease in numbers of sightings compared to the previous project but this may be partly due to the general decrease in seal activity (sightings, damage to catch and gear, use of caves) in the Ithaca channel during this project. The Ithaca channel was the area best monitored throughout both projects.

**III. «Monk Seal Conservation in Zakynthos».** EU programme LIFENATGR3222, contract B4-3200/96/500, “The Mediterranean monk seal in Greece: Conservation in action” co-ordinated by HSSPMS/MOm.

The project was carried out by Archipelagos in the period June 1998 - December 1999 in Zakynthos island on behalf of and in co-operation with WWF Greece (Archipelagos 1999). We applied here the same methodology we had developed in the central Ionian Sea and applied later on in Zakynthos for several years: monitoring of habitat use, own seal sightings and damages by seals to fish catch and gear and the operation of a network for collecting seal sightings by persons other than the team.

During the above project, a total of 65 seal sightings were reported by people other than the team. By the end of the project in December 1999, the absolute minimum seal population according to our own sightings matched with the sightings of other people was estimated to be 17 individuals (7 juveniles and 4 pups). But, most probably about 21-24 seals may actually have inhabited Zakynthos’ coasts (9-10 juveniles and 4 pups).

#### **IV. A network of fishermen for the protection of the marine resources**

In February 2008, the project with the title “A network of fishermen for the protection of the marine resources” was launched for 10 months in the Municipality of Livathos, S. Kefalonia. The project was part of the Operational Programme «EMPLOYMENT & PROFESSIONAL EDUCATION» of the Ministry of Employment and Social Protection, Measure 6 «Activities enhancing the employment through the active participation of non governmental organizations» (sub-project 51). It was financed by the European Social Fund (80%) and by national funds (20%).

Within the framework of the above sub-project, we improved our observers’ network by formally involving fishermen from the southern part of Kefalonia Municipality of Livathos and adjacent Municipalities as team members charged with the regular collection of monk seal sightings. Nevertheless, we continued, of course, obtaining also sightings of other persons from all over the area including photographs and maps of the observations’ sites sent by the observers.

Monk seal sightings were reported from all over the central Ionian Sea. A total of 26 seal sightings were recorded. The careful comparison of the sightings, taking into account the observation’s date and site as also the seals’ characteristics, yielded an absolute minimum number of 16 different seals (7-11 adults, 5-8 juveniles and 4 pups) while a “reasonable” number would be 20-23 animals.

## Conclusion

In the first three cases described above the absolute minimum population numbers are estimated by taking into account the number revealing when own seal sightings and other evidence and sightings by other reliable persons are compared. Within the framework of the project in 2008 no habitat surveys were carried out. Thus, the data available were only the reports of sightings by other persons except for one own sighting of a dark coloured juvenile seal in NE. Kefalonia during a land excursion. The comparison of these sightings revealed a number of animals well in accordance with the numbers in earlier years when field studies contributed to the population's estimation with own data.

Considering that no considerable changes have taken place (epizootics, sudden increase in deliberate killings of seals, etc.) we conclude that the collection of seal sightings on the spot by local networks familiar with the team can be a useful tool for the estimation of local monk seal populations.

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